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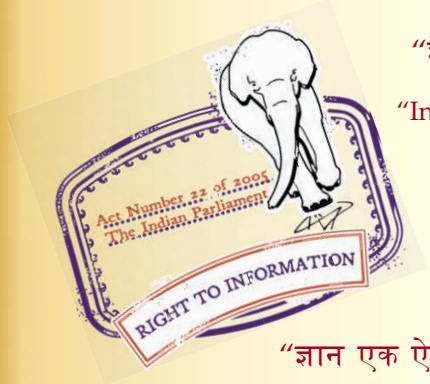
IS 9175-13 (1987): Rationalized Steels for Automobile and Ancillary Industry, Mechanical and Physical Properties - Part 13 40C15S12 Grade steel [MTD 16: Alloy Steels and Forgings]



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IS : 9175 (Part 13) - 1987
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Indian Standard

SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 13 MECHANICAL AND PHYSICAL PROPERTIES OF 40C15S12 GRADE STEEL

(First Reprint JANUARY 1991)

UDC 669.14:006.015.2:629.113

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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April 1988

Indian Standard

SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 13 MECHANICAL AND PHYSICAL PROPERTIES OF 40C15S12 GRADE STEEL

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(*Continued on page* 6)

Indian Standard

SPECIFICATION FOR RATIONALIZED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 13 MECHANICAL AND PHYSICAL PROPERTIES OF 40C15S12 GRADE STEEL

0. FOREWORD

0.1 This Indian Standard (Part 13) was adopted by the Bureau of Indian Standards on 25 September 1987, after the draft finalized by the Co-ordinating Committee on Materials for Automobiles had been approved by the Structural and Metals Division Council.

0.2 Part 1 of this standard was published in 1979 which covers the chemical composition of 33 rationalized steels. The mechanical properties, hardenability and isothermal transformation characteristics of these 33 rationalized steels are being covered in different parts of this standard (Parts 2 to 34). The data concerning these properties given in this standard is only for guidance and information purposes.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2 - 1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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1. SCOPE

1.1 This standard (Part 13) covers the mechanical properties and isothermal transformation characteristics of 40C15S12 grade of steel for use by automobile and ancillary industry.

*Rules for rounding off numerical values (*revised*).

2. CHEMICAL COMPOSITION

2.1 The chemical composition of this grade of steel shall be as given below :

Constituents, Percent

C	Si	Mn	S	P
0·35-0·45	0·10-0·35	1·30-1·70	0·035, *Max*	0·035, *Max*

3. MECHANICAL PROPERTIES

3.1 The mechanical properties of this grade of steel when supplied in the normalized condition when determined in accordance with IS : 1598 - 1977* and IS : 1608 - 1972† shall be as given below and in Tables 1 and 2 respectively:

a) Tensile strength, MPa 640

b) Elongation, *Min* gauge length $5{\cdot}65\sqrt{S_o}$, *Min*, percent

c) As quenched hardness 48 HRC, *Min*

TABLE 1 SPECIFIED TENSILE PROPERTIES FOR COLD-DRAWN BARS

Size	Tensile Strength MPa, *Min*	Elongation, Percent Gauge Length $5{\cdot}65\sqrt{S_o}$, *Min*
(1)	(2)	(3)
Up to 20 mm	670	7
Over 20 and up to 40 mm	630	8
Over 40 and up to 63 mm	610	10
Over 63 mm	590	11

TABLE 2 MECHANICAL PROPERTIES IN THE HARDENED AND TEMPERED CONDITION

Limiting Ruling Section	Tensile Strength, MPa	0·2 Percent Proof Stress, *Min* MPa	Elongation Gauge Length $5{\cdot}65\sqrt{S_o}$, *Min* Percent	Izod Impact, *Min* Joules
(1)	(2)	(3)	(4)	(5)
100	600 - 750	420	18	48
60	700 - 850	500	18	48
30	800 - 950	560	16	41

*Method for Izod impact test of metals (*first revision*).

†Method for tensile testing of steel products (*first revision*).

4. HEAT TREATMENT TEMPERATURES

4.1 The recommended heat treatment temperatures shall be as given below:

Nromalizing temperature	840-870°C
Hardening temperature	840-870°C
Tempering temperature	550-660°C

5. TRANSFORMATION CHARACTERISTICS

5.1 The isothermal transformation diagram for this grade of steel is given in Fig. 1.

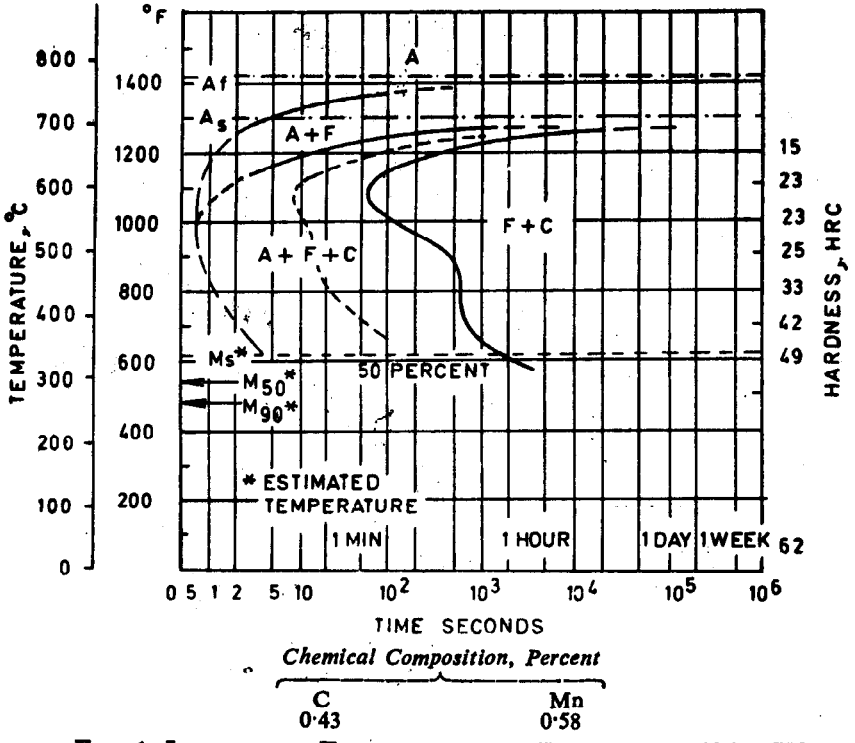

FIG. 1 ISOTHERMAL TRANSFORMATION DIAGRAM OF 40C15SI2 GRADE STEEL

(*Continued from page* 2)

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IS : 9175 (PART 13) - 1987 SPECIFICATION FOR RATIONALISED STEELS FOR THE AUTOMOBILE AND ANCILLARY INDUSTRY

PART 13 MECHANICAL AND PHYSICAL PROPERTIES OF 40C15S12 GRADE STEEL

(*Page* 4, *clause* **2.1**) — Substitute the following for the existing matter:

Constituents, Percent

C	Si	Mn	S	P
0·35-0·45	0·25 *Max*	1·30-1·70	0·08/0·15	0·060 *Max*

(*Page* 5, *clause* **5.1**, *above the caption of Fig.* 1) — Substitute the following for the existing matter:

Constituents, Percent

C	Si	Mn	S	P
0·35-0·45	0·25 *Max*	1·30-1·70	0·08/0·15	0·060 *Max*

(SMDC 31)

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